

CLAIM AMENDMENTS

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Cancelled)
6. (Cancelled)
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13. (Cancelled)
14. (Cancelled)
15. (Cancelled)
16. (Cancelled)
17. (Cancelled)
18. (Cancelled)
19. (Cancelled)
20. (Cancelled)
21. (New) A method for estimating indicated torque in an internal combustion engine
based on at least one crankshaft dynamic variable comprising:

estimating in-cylinder combustion pressure according to a stochastic estimation method that uses a statistical correlation function in the time domain to express said in-cylinder combustion pressure as a polynomial function of a measurement of said at least one crankshaft dynamic variable; and

calculating indicated torque using said internal combustion engine, crank-slider mechanism geometry, and said estimated in-cylinder combustion pressure.

22. (New) The method of claim 21 wherein said crankshaft dynamic variable is selected from the group consisting of crankshaft position, crankshaft velocity, and crankshaft acceleration.
23. (New) The method of claim 21 wherein said polynomial function for estimating in-cylinder combustion pressure is based on 36, 60, or 360 measurements of said at least one crankshaft dynamic variable per one revolution of the crankshaft.
24. (New) The method of claim 21 wherein said polynomial function comprises coefficients expressed as a polynomial function of said internal combustion engine operating conditions.
25. (New) The method of claim 24 wherein said of said internal combustion engine operating conditions comprise engine speed and engine load.
26. (New) The method of claim 25 wherein said engine speed is represented as the average rotational engine speed averaged over one complete engine cycle.
27. (New) The method of claim 25 wherein said engine load is represented as the average intake manifold absolute pressure averaged over one complete engine cycle.
28. (New) A method for estimating indicated torque in an internal combustion engine

based on at least one crankshaft dynamic variable comprising:

estimating coefficients of a polynomial function for estimating an in-cylinder combustion pressure using measurements of average engine speed and intake manifold pressure;

estimating said in-cylinder combustion pressure using said estimated coefficients and measurements of said at least one crankshaft dynamic variable;
and

calculating indicated torque using said internal combustion engine, crank-slider mechanism geometry, and said estimated in-cylinder combustion pressure.

29. (New) The method of claim 28 wherein said crankshaft dynamic variable is selected from the group consisting of crankshaft position, crankshaft velocity, and crankshaft acceleration.
30. (New) The method of claim 28 wherein said polynomial function for estimating in-cylinder combustion pressure is based on 36, 60, or 360 measurements of said at least one crankshaft dynamic variable per one revolution of the crankshaft.
31. (New) A method for estimating indicated torque in an internal combustion engine comprising:

estimating in-cylinder combustion pressure according to a stochastic estimation method that uses a statistical correlation function in time domain to express said in-cylinder combustion pressure as a polynomial function of a crankshaft position function, crankshaft velocity, or crankshaft acceleration; and

calculating indicated torque using said internal combustion engine, crank-slider mechanism geometry, and said estimated in-cylinder combustion pressure.

32. (New) The method of claim 31 wherein said crankshaft position function is an algebraic function of the crankshaft position.
33. (New) The method of claim 32 wherein said polynomial function for estimating in-cylinder combustion pressure is based on 36, 60, or 360 measurements of said crankshaft position, crankshaft velocity, or crankshaft acceleration per one revolution of the crankshaft.
34. (New) The method of claim 31 wherein said polynomial function comprises coefficients expressed as a polynomial function of said internal combustion engine operating conditions using a stochastic estimation method.
35. (New) The method of claim 34 wherein said of said internal combustion engine operating conditions comprise engine speed and engine load.
36. (New) The method of claim 35 wherein said engine speed is represented as the average rotational engine speed averaged over one complete engine cycle.
37. (New) The method of claim 35 wherein said engine load is represented as the average intake manifold absolute pressure averaged over one complete engine cycle.
38. (New) A method for estimating indicated torque in an internal combustion engine comprising:
 - estimating coefficients of a polynomial function for estimating indicated torque using measurements of average engine speed and intake manifold pressure; and
 - estimating indicated torque using said estimated coefficients and measurements of at least one crankshaft dynamic variable.

39. (New) The method of claim 38 wherein estimating indicated torque using said estimated coefficients and measurements of at least one crankshaft dynamic variable comprises using 36, 60, or 360 measurements of said at least one crankshaft dynamic variable per revolution of the crankshaft.
40. (New) The method of claim 39 wherein said at least one crankshaft dynamic variable is selected from the group consisting of crankshaft position, crankshaft velocity, and crankshaft acceleration.
41. (New) A method for estimating indicated torque in an internal combustion engine based on a plurality of crankshaft dynamic variables comprising:
- estimating in-cylinder combustion pressure according to a stochastic estimation method that uses a statistical correlation function in the time domain to express said in-cylinder combustion pressure as a polynomial function of a measurement of said plurality of crankshaft dynamic variables; and
 - calculating indicated torque using said internal combustion engine, crank-slider mechanism geometry, and said estimated in-cylinder combustion pressure.
42. (New) The method of claim 41 wherein said plurality of crankshaft dynamic variables are selected from the group consisting of crankshaft position, crankshaft velocity, and crankshaft acceleration.